

AMENDMENT UNDER 37 C.F.R. § 1.111
Application No. 09/315,068

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

/ Claim 1 (currently amended): A semiconductor laser comprising an active region which includes at least a quantum well layer and upper and lower optical waveguide layers on opposite sides of the at least a quantum well layer, the active region quantum well layer, the upper optical waveguide layer, and the lower optical waveguide layer each being formed of $In_xGa_{1-x}As_yP_{1-y}$ ($0 \leq x \leq 1$, $0 \leq y \leq 1$), and upper and lower cladding layers formed of AlGaAs on opposite sides of the active region, wherein the improvement comprises that

at least one of the said upper optical waveguide layers is not smaller than $0.25\mu m$ in thickness, and

a part of the upper cladding layer on the upper optical waveguide layer is selectively removed up to the interface of the upper cladding layer and the upper optical waveguide layer.

/ Claim 2 (previously presented): A semiconductor laser as defined in Claim 1 in which the structure where said part of the upper cladding layer on the upper optical waveguide layer which is selectively removed up to the interface of the upper cladding layer and the upper optical waveguide layer forms a ridge structure.

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Claim 3 (withdrawn--original): A method of manufacturing a semiconductor laser defined in Claim 1 comprising the steps of forming at least one of the optical waveguide layers in thickness not smaller than $0.25\mu\text{m}$, forming the upper cladding layer of AlGaAs on the upper optical waveguide layer and selectively removing by etching a part of the upper cladding layer on the upper optical waveguide layer up to the interface of the upper cladding layer and the upper optical waveguide layer.

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Claim 4 (withdrawn--previously presented): A method of manufacturing a semiconductor laser further to Claim 3, wherein no intermediate layer is formed between the upper optical waveguide layer and the upper cladding layer to protect the upper optical waveguide during said step of selectively removing by etching a part of the upper cladding layer.

/ Claim 5 (previously presented): A semiconductor laser as defined in Claim 1, wherein the upper and lower optical waveguide layers on opposite sides of the quantum well layer are different thicknesses.

/ Claim 6 (previously presented): A semiconductor laser as defined in Claim 1, wherein a thickness of the upper cladding layer is greater than zero, but less than or equal to $1\mu\text{m}$.

/ Claim 7 (previously presented): A semiconductor laser as defined in Claim 6, wherein a thickness of the upper cladding layer is greater than zero, but less than $1\mu\text{m}$.

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/ Claim 8 (previously presented): A semiconductor laser as defined in Claim 1, wherein said at least a quantum well layer is one quantum well layer.

Claim 9 (cancelled)

/ Claim 10 (previously presented): A semiconductor laser as defined in 1, wherein a resonator of said semiconductor laser is formed as a stripe, boundaries of the interface between said upper cladding layer and said upper optical waveguide layer defining a stripe width of said resonator, said part of the upper cladding layer on the upper optical waveguide layer which is selectively removed defining a lateral edge of the stripe.

/ Claim 11 (previously presented): A semiconductor laser as defined in 10, wherein said part of the upper cladding layer on the upper optical waveguide layer which is selectively removed is outside said stripe, said upper cladding layer forming a mesa stripe structure and said semiconductor laser being of a ridge waveguide type.

/ Claim 12 (currently amended): A semiconductor laser comprising an active region which includes at least one quantum well layer and upper and lower optical waveguide layers on opposite sides of said at least one quantum well layer, the active region quantum well layer, the upper optical waveguide layer, and the lower optical waveguide layer each being formed of

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In_xGa_{1-x}As_yP_{1-y} (0≤x≤1, 0≤y≤1), and upper and lower cladding layers formed of AlGaAs on opposite sides of the active region, wherein the improvement comprises that

~~at least one of the said upper optical waveguide layers layer~~ is not smaller than 0.25μm in thickness,

a current blocking layer interposed between portions of the upper cladding layer and the upper optical waveguide layer, said current blocking layer being on the upper optical waveguide layer, and the portions of the upper cladding layer and the upper optical waveguide layer having the current blocking layer interposed being along opposite lateral edges of said semiconductor laser, and

an interface of the upper cladding layer and the upper optical waveguide layer, said interface being adjacent to said portions of the upper cladding layer and the upper optical waveguide layer having the current blocking layer interposed.

Claim 13 (previously presented): A semiconductor laser as defined in Claim 12, wherein said current blocking layer is AlGaAs, having an opposite conductivity type to said upper cladding layer.

Claim 14 (previously presented): A semiconductor laser as defined in Claim 12, wherein the upper and lower optical waveguide layers on opposite sides of said at least one quantum well layer are different thicknesses.

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Claim 15 (previously presented): A semiconductor laser as defined in Claim 12, wherein a thickness of the upper cladding layer is greater than zero, but less than or equal to 1 μm .

Claim 16 (previously presented): A semiconductor laser as defined by Claim 15, wherein a thickness of the upper cladding layer is greater than zero, but less than 1 μm .

/ Claim 17 (previously presented): A semiconductor laser as defined in Claim 12, wherein said at least one quantum well layer is one quantum well layer.

Claim 18 (cancelled)

/ Claim 19 (previously presented): A semiconductor laser as defined in 12, wherein a resonator of said semiconductor laser is formed as a stripe, boundaries of the interface between said upper cladding layer and said upper optical waveguide layer defining a stripe width of said resonator, said portions of the upper cladding layer and the upper optical waveguide layer having the current blocking layer interposed defining lateral edges of the stripe.

/ Claim 20 (previously presented): A semiconductor laser as defined in 19, wherein said portions of the upper cladding layer and the upper optical waveguide layer having the current blocking layer interposed form a mesa stripe channel, said interface of the upper cladding layer and the upper optical waveguide layer being inside said mesa stripe channel.